

# **Advanced Platform Technologies for Earth Science**

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Advanced new platform technologies are critical to the realization of NASA's Earth Science Enterprise (ESE) future Earth observation objectives. This conclusion is evident in the ESE's planning for a new Earth observing and analysis paradigm, known as the Earth Science Vision, which is intended to revolutionize our understanding of and predictive capability of the Earth's environment and climate in the 2020 timeframe. Historically, Earth science investigations have been independent and highly focused. However, the Earth's environment is a very dynamic and interrelated system. Single snapshots of an individual ground area or the composition of any single atmospheric column are not sufficient to understand the interdependencies and complexities of the Earth's environment. The traditional "stovepipe" method of science data collection from a single platform is no longer sufficient. A fuller understanding of the intricacies of the Earth environment will require accessing extensive amounts of data and providing timely global coverage. Thus, the entire approach to earth observations needs to be revised. Observing systems must be flexible, reconfigurable, autonomous, and cooperative. A key element envisioned for accomplishing these difficult challenges is the idea of a distributed, heterogeneous, and adaptive observing system or sensor web. The evolution of multi-platform observations is envisioned to proceed from virtual observing system and simple satellite formations, to multiple satellite virtual instrument systems, and finally to actively managed integrated sensor webs. This evolution demands both the development of smaller and lower cost spacecraft, and at the same time innovative developments of ultra large apertures. The spacecraft technology challenges then are to develop an intelligent distributed spacecraft infrastructure founded in advanced communications, onboard processing, low cost spacecraft and autonomy.

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